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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Jian-Ku Shang

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EXAMINER

GRAY, JILL M

ART UNIT

PAPER NUMBER

1794

MAIL DATE

DELIVERY MODE

11/03/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/797,582	Applicant(s) SHANG ET AL.	
	Examiner Jill Gray	Art Unit 1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 October 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 46,47 and 49-54 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 46,47 and 49-54 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. Applicant's amendment, see After-Final Amendment, filed October 16, 2009, has been entered. Therefore, the previous rejection has been withdrawn. The finality of the last Office Action has been withdrawn. PROSECUTION IS HEREBY REOPENED. A new ground(s) of rejection follows.

2. Pursuant to the entry of the amendment of October 16, 2009, the status of the claims is as follows: Claims 1-45 and 48 have been cancelled. Claims 46-54 are pending and under prosecution. Claims 46 and 47 are amended.

Claim Rejections - 35 USC § 103

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. Claims 46-47 and 49-54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sowards et al., 3,518,206 (Sowards) in view of Morikawa et al., 6,743,749 B2 (Morikawa).

Sowards teaches catalyst substrates or supports such as rods, tubes and tube bundles having a low surface area coated with highly active catalyst coatings of high specific surface areas (see abstract, column 1, lines 54-59.) The highly active catalysts coatings can include porous materials such as alumina (Al_2O_3), titania, zirconia and magnesia; (see column 7, lines 9-13 and 30-59). In addition, Sowards teaches that alumina, titania, zirconia and magnesia are suitable granular porous materials, thus establishing them as equivalents. Sowards additionally teaches that the Al_2O_3 can

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have a BET surface area of approximately $160 \text{ m}^2/\text{g}$ and $325 \text{ m}^2/\text{g}$. (see Examples 2 and 3).

Sowards is silent as to the coatings including TiON or TiOS.

Morikawa teaches photocatalyst materials comprising TiON or TiOS. See entire document, and for example, abstract. In addition, Morikawa teaches that TiON and TiOS are titanium compounds obtained by introducing nitrogen or sulfur to titanium oxide crystals and have an active photocatalytic function not only when exposed to light in the ultraviolet range, but also under light in the visible range. Therefore, the photocatalytic function similar to that in TiO_2 can be obtained with visible light as the operational light. See column 2, lines 1-15.

It would have been obvious to one having ordinary skill in the art to modify the teachings of Sowards by introducing nitrogen or sulfur into his titania materials, and thus producing TiON or TiOS to result in a titania catalyst capable of operating in the visible light range in addition to the ultraviolet range.

Regarding claim 51, Sowards teaches that his ceramic materials can further include silver. See Examples, and for example, Example 5.

Regarding claims 49, 52-54 (the BET surface area), the prior art clearly establishes that fibers coated with high surface area ceramics (Sowards) and that said ceramics having a BET surface area of at least $200 \text{ m}^2/\text{g}$ are known. The fact that Sowards teaches Al_2O_3 having a BET of $325 \text{ m}^2/\text{g}$ applied to a substrate and his additional teaching that this substrate could be rods, tubes or tube bundles, would have suggested to the skilled artisan at the time the invention was made that a fiber having a

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high surface area ceramics with a BET of at least $200 \text{ m}^2/\text{g}$, (as required by claims 46, 49, and 52-53) is known and obvious. Again, as set forth above, Sowards teaching that alumina, titania, zirconia and magnesia are suitable granular porous materials, establishes these materials as equivalents and the skilled artisan would at once envisage titania having a BET surface area of at least $200 \text{ m}^2/\text{g}$. Moreover, the teachings of Morikawa would have provided a suggestion to the skilled artisan that the ceramic coating can be TiON or TiOS with the reasonable expectation of increased catalytic activity.

Regarding claim 50, it is the examiner's position that since the result sought and the ingredients used were known, it was within the expected skills of one having ordinary skill in this art to arrive at the optimum proportion of ceramic coating by weight of the ceramic coated fiber, and any improved results alleged by applicants would have resulted from experimentation of an obvious nature, and were nothing more than what one would have expected. *In re Reese*, 129 USPQ 402 (CCPA 1961).

Therefore, the combined teachings of Sowards and Morikawa would have rendered obvious the invention as claimed in present claims 46-47 and 49-54.

5. Claims 46-47, 49-50 and 52-54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morikawa et al., 6,680,277 B2 or US 2002/0006865 A1 (referred to collectively as Morikawa, and all references are based upon '865) in view of Sowards, as applied above to claims 46-47 and 49-54.

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Morikawa discloses a substrate that can be a fiber [0029] and [0056] having a porous medium formed thereon, wherein the porous medium can be a Folded Sheet Mesoporous Material (FSM) or a mesoporous molecular sieve (MCM). See [0042] and [0043]. These materials can be alumina, silica, zirconia, and titanium. Note [0012]. The FSM or MCM have a photocatalyst material such as TiON deposited thereon. See entire document and for example [0045] and [0046].

Morikawa is silent as to the BET surface area.

Sowards is as set forth above and teaches catalyst substrates or supports such as rods, tubes and tube bundles having a low surface area coated with highly active catalyst coatings of high specific surface areas (see abstract, column 1, lines 54-59.) The highly active catalysts coatings can include porous materials such as alumina (Al_2O_3), titania, zirconia and magnesia; (see column 7, lines 9-13 and 30-59). In addition, Sowards teaches that alumina, titania, zirconia and magnesia are suitable granular porous materials, thus establishing them as equivalents. Sowards additionally teaches that the Al_2O_3 can have a that the Al_2O_3 can have a BET surface area of approximately $160 \text{ m}^2/\text{g}$ and $325 \text{ m}^2/\text{g}$. (see Examples 2 and 3).

Regarding claims 46, 49, 52-54 (the BET surface area), the prior art clearly establishes that fibers coated with high surface area ceramics (Sowards) and that said ceramics having a BET surface area of at least $200 \text{ m}^2/\text{g}$ are known. The fact that Sowards teaches Al_2O_3 having a BET of $325 \text{ m}^2/\text{g}$ applied to a substrate and his additional teaching that this substrate could be rods, tubes or tube bundles, would have suggested to the skilled artisan at the time the invention was made that a fiber having a

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high surface area ceramics with a BET of at least 200 m²/g, (as required by claims 46, 49, and 52-53) is known and obvious. Again, as set forth above, Sowards teaching that alumina, titania, zirconia and magnesia are suitable granular porous materials, establishes these materials as equivalents and the skilled artisan would at once envisage titania having a BET surface area of at least 200 m²/g. Moreover, the teachings of Morikawa would have provided a suggestion to the skilled artisan that the ceramic coating can be TiON or TiOS with the reasonable expectation of increased catalytic activity.

Regarding claim 50, it is the examiner's position that since the result sought and the ingredients used were known, it was within the expected skills of one having ordinary skill in this art to arrive at the optimum proportion of ceramic coating by weight of the ceramic coated fiber, and any improved results alleged by applicants would have resulted from experimentation of an obvious nature, and were nothing more than what one would have expected. *In re Reese*, 129 USPQ 402 (CCPA 1961).

Therefore, the combined teachings of Morikawa and Sowards would have rendered obvious the invention as claimed in present claims 46-47, 49-50, and 52-54.

No claims are allowed.

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. All references cited on the PTO-892 should be reviewed by applicants. In particular, Takashi et al., US 2002/0169076 A1.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jill Gray whose telephone number is 571-272-1524.

The examiner can normally be reached on M-Th and alternate Fridays 10:00-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rena Dye can be reached on 571-272-3186. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jill Gray/
Primary Examiner
Art Unit 1794

jmg